THE USE OF WETTING AGENTS IN COLEOPTEROLOGY

By W. Wayne Boyle[1]

Many of the aspects of beetle study involve the use of water in one way or another. Dried specimens may be soaked in water for relaxing and cleaning prior to mounting, of course; and water is commonly used as a vehicle in the clearing, staining, and manipulation of dissected organs such as genitalia and mouth parts. The time required for these processes to occur and the difficulty in accomplishing them appear invariably to bear a direct correlation with the surface tension of the water used. As a consequence they may be speeded up or done more easily by decreasing the surface tension of the water, or, in non-technical parlance, "softening" it.

Surface tension may be reduced by adding a small amount of a household detergent or a commercial wetting agent (also called surface-active agents or surfactants) to the water to be used. I have used "Triton X-100" (one of the older commercial wetting agents) for several years with good results. A stock solution of one part of this material to 20 parts of water is made up and kept in a 250-ml. bottle on my desk. One to several drops of this are then added to small amounts of water whenever it is used in working with beetles. There seems to be little difference in effectiveness between the powdered and liquid materials, but the latter are somewhat more convenient to use in making up the stock solution. Processes involving the use of detergent-treated water may be accelerated even further by applying heat to the solution.

Water that has been "softened" by the addition of a detergent yields the following advantages. Dried specimens may be quickly and conveniently relaxed prior to pinning or dissection by soaking for a few minutes. Absorption of water by the internal tissues is greatly accelerated by detergents, however; and it is important to see that specimens to be mounted, especially small ones, do not become unduly distended by separation of the tagmata, for this distension is seldom reversed by drying. Beetles less than 5 mm. in length should not be soaked for more than ten or fifteen minutes and should be mounted on paper points by means of a water-soluble glue. (The use of any other type of adhesive renders subsequent removal of the specimen for any purpose difficult without damaging it.) The adhesive qualities of water-soluble glues are improved by the addition and thorough mixing in of a few drops of water containing a detergent.

Either dried or freshly killed specimens that are encrusted with dirt, grease, or lepidopterous scales can be easily cleaned by manipulation with forceps and a camel's-hair brush in softened water; and the relaxing of dried specimens is accomplished at the same time. Dissected sclerotized parts, such as genitalia and mouth parts, can be cleared in potash solution more quickly if the water contains a detergent. If it is desirable to stain such preparations with mercurochrome or other water-soluble stains, the staining process is accelerated by using water softened with detergent. Moreover, tiny sclerotized parts can be pushed below the surface film easily for observation, staining, or other treatment in softened water. It seems likely that the use of a detergent would expedite the staining in aqueous solutions of any histological preparation.

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